**Is it possible to estimate atmospheric nitrogen deposition by analysis of terrestrial mosses?**

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Mosses are considered to act as an integrator of the contaminant load that they receive, take up pollutants due to biological characteristics such asthe absence of a protective cuticle and the lack of roots, and provide quantitative values reflecting levels of atmospheric deposition. These features make mosses suitable candidates to be biomonitors of air pollution. However, mosses are a diverse group of plants with over 10,000 described species worldwide which exhibit a wide variety of life forms and biology.

As a bryophyte ecophysiologist, I have been studying the physiological responses of mosses to nitrogen (N) deposition in different types of ecosystem. My experience shows that mosses cannot be considered as a single functional group with respect to their response to N deposition, and thus that a moss species should not necessarily be expected to be a good biomonitor of atmospheric N deposition just because it belongs to this group of plants. In this paper, I will illustrate this finding by comparing species of bryophyte within three ecosystems. In this paper, I will discuss why two common mosses of European grasslands, *Pseudoscleropodium purum* and *Rhytidiadelphus squarrosus*, significantly differ in their suitability to be biomonitors of N deposition, as a result of their biological differences. I will explain how the substrate type preference of *Braunia secunda*, a common moss found in tropical mountain forest in Mexico, renders this moss a better bioindicator of N deposition than other co-occurring moss species, such as *Thuidium delicatulum* or *Leptodontium viticulosoides*. Finally, I will show that in semiarid Mediterranean ecosystems, the moss *Pleurochaete squarrosa* is a better predictor of N deposition than the lichen *Cladonia foliacea,* because of its physiological response to N loads. In addition, I will discuss the problem of nitrogen saturation that occurs in certain variables, such as N% in moss tissue, and consider how the measurement of a suite of selected physiological variables may reduce this problem in areas with high N loads.

I conclude from my experience that, within mosses, efficacy as a biomonitor of N deposition is species-specific. Therefore, preliminary studies are recommended in order to select a suitable species before going on to conduct biomonitoring studies of atmospheric nitrogen deposition.